

STUDIES ON THE SYSTEMATICS OF THE SHORE-FLY
TRIBE DAGINI (DIPTERA: EPHYDRIDAE)

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Abstract.—Six new species of the tribe Dagini are described in the genera *Psilephydra* Hendel (*kaskiensis*, *nepalensis*, *lyneborgi*, *iridescens*) and *Dagus* Cresson (*splanglerorum* and *dominicanus*). Revised keys are provided for all known species of both genera and for the genera of the tribe. *Psilephydra* is rediagnosed and divided into two species groups (the *fluvialis* and *cyanoprosopa* groups), and the phylogeny of the taxa treated is discussed. A catalog to all taxa of Dagini is presented, including the new species and new distributional data.

The purpose of this paper is to present additional information on the shore-fly tribe Dagini. Mathis (1982) proposed Dagini as a tribe within the subfamily Ephydrinae. Initially the tribe comprised four genera and 11 species as follows (number of species indicated in parenthesis): *Dagus* Cresson (1), *Psilephydra* Hendel (2), *Physemops* Cresson (6), and *Diedrops* (Mathis and Wirth (2)). In three subsequent papers, Mathis (1983, 1984) and Mathis and Hogue (1986) described four additional species in the genera *Dagus* and *Diedrops*. In the latter paper, the third-instar larva and puparium of *Diedrops roldanorum* were described, the first immatures known for the tribe. Since publication of these papers, numerous additional specimens of Dagini have been made available to us, including several that represent new species in the genera *Psilephydra* and *Dagus*. Descriptions of these new species are presented here. The addition of new species to *Psilephydra* also necessitates some changes to the characterization of that genus. In addition to the descriptions, we present revised keys to the genera of Dagini

and to the species of the genera with new species and a catalog of the tribe.

In this paper we essentially follow the methods and format presented in the above-cited papers. Those works should be consulted for additional details and perspective.

Two head and two venational ratios are used commonly in the descriptions and are defined here for the convenience of the user (ratios are based on measurement of three specimens if available).

Eye-to-cheek ratio: Genal height (immediately below the eye)/eye height.

Eye width-to-face length ratio: Face length (in profile from anterior margin of eye to anterior margin of face)/eye width (greatest horizontal distance along plane of eye).

Costal vein ratio: The straight line distance between the apices of R_{2+3} and R_{4+5} /distance between the apices of R_1 and R_{2+3} .

M vein ratio: The straight line distance along M basad of crossvein dm-cu/distance distal to crossvein dm-cu.

Acronyms used in the text to indicate depositories of specimens are as follows: BPBM

(Bernice P. Bishop Museum, Honolulu, Hawaii); HNHM (Hungarian Natural History Museum, Budapest, Hungary); ZMC (Zoological Museum, Copenhagen, Denmark); USNM (National Museum of Natural History, Smithsonian Institution, Washington, D.C.).

KEY TO THE GENERA AND SPECIES GROUPS OF DAGINI

1. Pulvilli lacking; postpronotum with 1 to a few setulae *Dugos* Cresson
- Pulvilli present, conspicuous; postpronotum bare 2
2. Distance between apices of veins R_{2+3} and R_{4+5} short, less than half distance between veins R_{4+5} and M; gena high, equal to or greater than eye height; genal seta well developed and conspicuous; prescutellar acrostichal setae well developed; propleuron setulose; 5th tarsomere with dorsoapical process extended beyond base of tarsal claws *Diedrops* Mathis and Wirth
- Distance between apices of veins R_{2+3} and R_{4+5} subequal to that between veins R_{4+5} and M; gena short, usually not more than $\frac{1}{2}$ eye height; genal seta, if present, weakly developed and inconspicuous; prescutellar acrostichal setae not evident; propleuron without setulae; 5th tarsomere not as above 3
3. Two to 3 large, postsutural dorsocentral setae; arista mostly bare, at most with small hairs (their lengths less than aristal width at base) along basal $\frac{1}{4}$ (*Psilephydra* Hendel) 4
- One large, postsutural dorsocentral seta inserted near scutellum; arista pectinate or macropubescent along at least basal $\frac{2}{3}$ (*Physemops* Cresson) 5
4. Anterior notopleural seta weakly developed, much smaller than the posterior seta; fore femur with posteroventral row of short, spine-like setae the *cyanoprosopa* group
- Anterior notopleural seta well developed, subequal in length to posterior seta; fore femur unarmed, lacking spine-like setae the *fluvialis* group
5. Halter capitellum black; ocellar bristles lacking; arista long, over twice combined length of first 3 antennal segments; vein CuA_1 along posterior margin of discal cell bowed posteriorly the *nemorosus* group
- Halter capitellum pale, usually yellowish; ocellar setae present, conspicuous; arista shorter, rarely not over twice combined length of first 3 antennal segments; vein CuA_1 along posterior margin of discal cell straight the *panops* group

Genus *Psilephydra* Hendel

Psilephydra Hendel 1914: 99. Type species: *Psilephydra cyanoprosopa* Hendel 1914, by original description (see catalog section, p. 120, for a more complete synonymy).

Diagnosis.—Moderately small to medium-sized shore flies, length 2.0 to 3.4 mm.

Head: Frons wide (width-to-length ratio 2.3–2.7), fronto-orbital setae 2–4, often minute; ocellar setae present; both inner and outer vertical setae present. Arista moderately long, length nearly twice to three times length of 1st flagellomere, apex virtually bare, basal $\frac{2}{3}$ with some dorsal, minute setulae or nearly bare; 1st flagellomere longer than pedicel but not twice length of latter; face generally shield-like, either shallowly and uniformly protrudent over entire height or with lower $\frac{2}{3}$ slightly but distinctly more protrudent (best seen in profile), sparsely covered by setae and densely microtomentose with coloration metallic silvery to bronzy; eye-to-cheek ratio 0.30–0.66; genal setae usually present. Palpus elongate, dark colored.

Thorax: Mesonotum and pleura subshining to shining; anterior notopleural seta subequal or much smaller than posterior seta; dorsocentral setae 2–5; prescutellar acrostichal setae lacking; postalar seta 1, well developed; scutellar setae with anterior pair usually smaller, although length variable as compared to apical pair; propleuron bare; katepisternal seta subequal or smaller in length than posterior anepisternal seta. Halter whitish to yellowish. Wing hyaline or uniformly lightly darkened; costal vein ratio 0.16–0.23; M vein ratio 0.51–0.73. Distance between veins R_{2+3} and R_{4+5} about equal to that between veins R_{4+5} and M. Legs blackish; fore femur thickened, with or without posteroventral row of short, spine-like setae.

Male genitalia: Epandrium shield-like, forming cereal activity dorsally; surstyli either distinct or apparently fused to ventral

margin; gonite in lateral view with slender, ventral and anterior projections; aedeagal apodeme long and very slender; aedeagus either about as wide as long or longer than wide.

Discussion.—We have divided *Psilephydra* into the *fluvialis* and *cyanoprosopa* groups, as characterized in the above key or following diagnoses. Eventually, each may be recognized as a separate genus because of the many differences between them (see species group diagnoses). Although our key to the species of the genus includes all known species, we are providing descriptions for the new species only.

KEY TO SPECIES OF *PSILEPHYDRA*
HENDEL

- 1. Anterior notopleural seta weak, much smaller than the posterior seta; fore femur with posteroventral row of short, spine-like setae 2
- Anterior notopleural seta well developed, subequal to posterior seta; fore femur unarmed, lacking spine-like setae 4
- 2. Mesonotum dark blue; trochanters dark; eye-to-cheek ratio more than 0.5 (India)
 *P. lyneborgi* Zatwarnicki, new species
- Mesonotum dark brown; trochanters pale, yellowish to orangish; eye-to-cheek ratio less than 0.5 3
- 3. First flagellomere pale; scutellum flat; wings uniformly darkened; costa not thickened (Thailand) *P. iridescens* Zatwarnicki, new species
- First flagellomere blackish, concolorous with scape and pedicel; scutellum convex; wings hyaline; costa thickened (Taiwan)
 *P. cyanoprosopa* Hendel
- 4. Face distinctly bicolored and protrudent on ventral ½, dorsal surface of protrusion metallic blue, ventral portion along oral margin densely microtomentose, whitish gray (Nepal)
 *P. kaskiensis* Mathis, new species
- Face either unicolorous or with colorational changes gradual, anterior surface of ventral ½ nearly flat 5
- 5. Dorsocentral setae 5, anterior seta presutural; overall length 2.9 to 3.4 mm (Nepal)
 *P. nepalensis* Mathis, new species
- Dorsocentral setae 3, all postsutural; overall length 2 to 2.6 mm (Japan and Ryukyu Islands)
 *P. fluvialis* (Miyagi)

The *fluvialis* Group

Diagnosis.—Genal seta well developed, conspicuous; anterior notopleural seta well

developed, subequal to posterior seta, posterior seta inserted at elevated level compared with anterior seta; katepisternal seta well developed, subequal in size to anepisternal seta; fore femur unarmed, lacking spine-like setae.

Species included.—*Psilephydra fluvialis* (Miyagi), *P. kaskiensis* Mathis, and *P. nepalensis* Mathis.

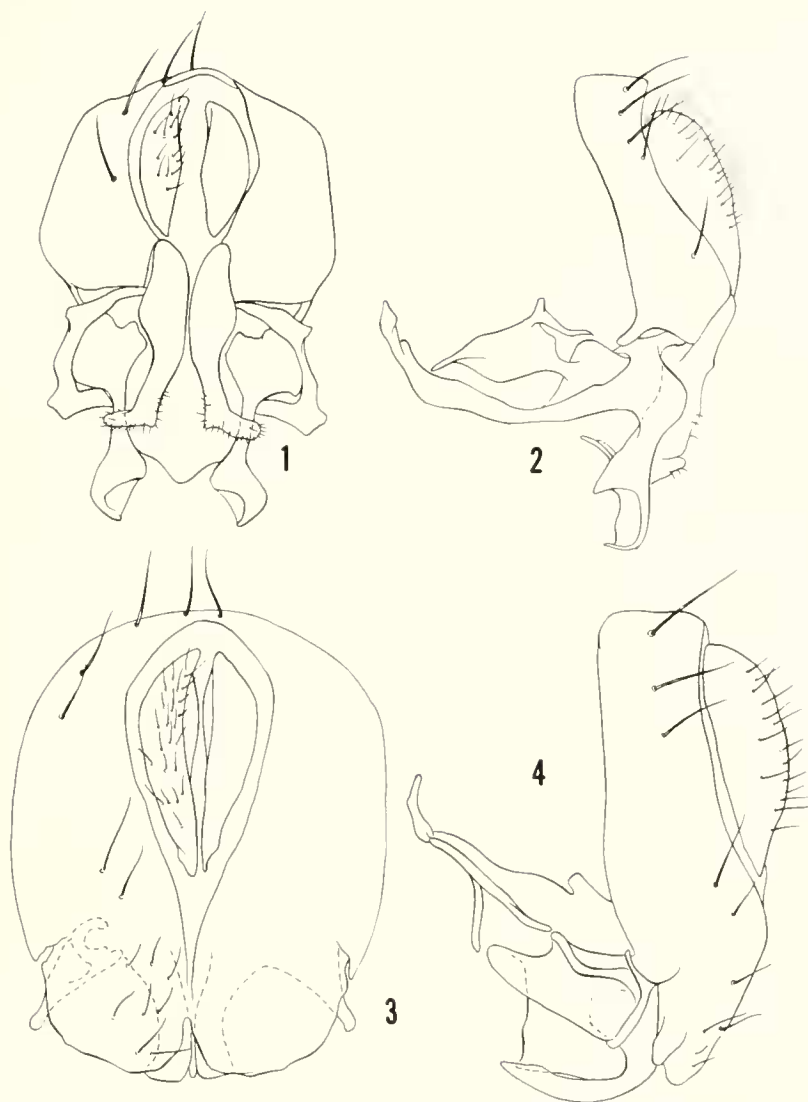
Psilephydra kaskiensis Mathis,
NEW SPECIES
Figs. 1–2

Description.—Moderately small shore flies, length 2.50 to 2.90 mm.

Head: Fronto-orbits and mesofrons bare, shining, with bronzish brown metallic luster; parafrons slightly duller, with sparse microtomentum; fronto-orbital setae 3, posterior 2 larger and subequal in size. Arista with minute hairs, length slightly more than 3 × length of 1st flagellomere. Face distinctly bicolored and protrudent on ventral ½, dorsal surface or protrusion metallic blue, ventral portion along oral margin densely microtomentose, whitish gray. Eye-to-cheek ratio 0.30; genal seta well developed and conspicuous.

Thorax: Mesonotum and pleural sclerites mostly shining, with dark brown, metallic luster, only propleuron densely microtomentose, with grayish coloration. Anterior notopleural seta well developed, subequal to posterior seta, posterior seta inserted at distinctly higher level than anterior seta; dorsocentral setae 3, 2 larger posterior setae (including posteriormost, slightly laterally displaced seta) and a smaller anterior seta, anterior seta either sutural or postsutural; basolateral scutellar seta moderately long, about ½ length of apical seta; katepisternal seta well developed, subequal in size to posterior anepisternal seta. Costal vein ratio 0.16; M vein ratio 0.73. Legs, including trochanters, entirely blackish; fore femur unarmed, lacking spine-like setae; setulae on hind coxal strap variable (present on holotype).

Abdomen: Male genitalia as in Figs. 1–2:



Figs. 1–4. *Psilephydra kaskiensis*. 1, Male genitalia, posterior view. 2, Male genitalia, lateral view. *Psilephydra nepalensis*. 3, Male genitalia, posterior view. 4, Male genitalia, lateral view.

epandrium in posterior view about as high as wide, dorsal margin rounded, ventral margin somewhat truncate; surstyli inserted medially at ventral margin of epandrium, each a ventrally projected, linear, more or less sinuate process that is foot-like and setulose apically; gonite in lateral view a 2-pronged process, basal $\frac{2}{3}$ of ventral process gradually enlarging from base to apex, thereafter forming a hook-like apex with rounded emargination of anterior surface,

anterior process narrowly linear and more or less parallel sided, joined anteriorly with similar process from opposite side; aedeagal apodeme a broadly formed plate-like process lying between anterior gonal processes and base of aedeagus; aedeagus apparently lacking or greatly reduced, mostly membranous; aedeagal apodeme reduced, a well-sclerotized V- to Y-shaped structure that is attached to hypandrium.

Type material.—The holotype male is la-

beled "NEPAL.Kaski Dist[riect] Chomrung, Sinuwa[,] 2250 m, 22 Oct 1985[,] Wayne N. Mathis." The allotype female and three additional paratypes (2♂, 1♀; USNM) bear the same label data as the holotype. The holotype is double mounted (minute nadel in plastic elastomere block), is in good condition (abdomen removed, dissected, preserved in glycerine in an attached microvial), and is deposited in the National Museum of Natural History (USNM), Smithsonian Institution.

Distribution.—This species is known only from the type series from Nepal.

Etymology.—The specific epithet, *kaskiensis*, alludes to the district in Nepal where this species was collected.

Remarks.—This species, although similar to *P. nepalensis* and *P. fluvialis*, is readily distinguished from its congeners by the distinctly bicolored and ventrally protrudent face, shining thorax, especially the pleural area, smaller size, and structures of the male genitalia.

In a few external features, this species is quite similar to those of the genus *Dagus*, the nominate genus of the tribe Dagini (see discussion under that genus below). The protrudent and rounded lower face (best seen in profile) is especially like *Dagus*.

***Psilephydra nepalensis* Mathis,**

NEW SPECIES

Figs. 3–4

Description.—Moderately small to medium-sized shore flies, length 2.90 to 3.40 mm.

Head: Frons subshining, moderately invested with microtomentum; mesofrons undifferentiated; fronto-orbital setae 3, posterior 2 larger and subequal in size. Arista with minute hairs, length slightly more than 3× length of 1st flagellomere. Facial protrusion occupying most of face, protrusion not limited to ventral ½; face generally microtomentose, becoming more densely so ventrally; facial coloration dark gray dorsally to whitish gray ventrally, colorational

change gradual. Eye-to-cheek ratio 0.40; genal seta well developed, conspicuous.

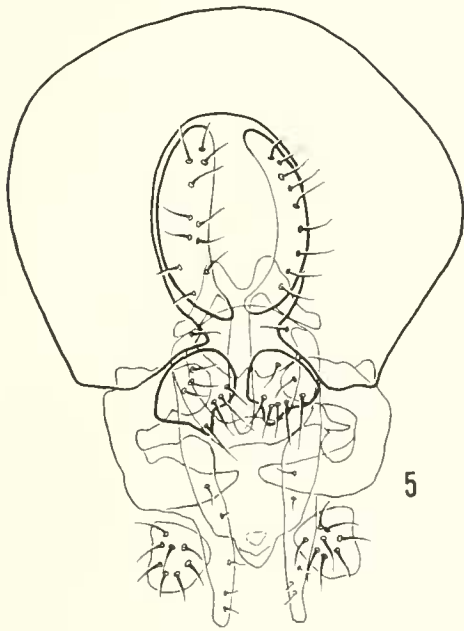
Thorax: Mesonotum moderately invested with microtomentum, subshining, dark brown; pleural sclerites from anepisternum ventrad more densely microtomentose than mesonotum, microtomentum gray. Anterior notopleural seta well developed, subequal to posterior seta, posterior seta inserted at distinctly higher level than anterior seta; dorsocentral setae 5, 3 larger posterior setae (including posteriormost, slightly laterally displaced seta) and 2 smaller anterior setae, anterior setae either sutural or pre-sutural; basolateral scutellar seta moderately long, about ½ length of apical seta; kat-episternal seta well developed, subequal in size to posterior anepisternal seta. Costal vein ratio 0.16; M vein ratio 0.58. Legs, including trochanters, entirely dark colored, blackish; fore femur unarmed, lacking spine-like setae; hind coxal strap bearing 1 ventral setula.

Abdomen: Male genitalia (Figs. 3–4) as follows: epandrium and surstyli in posterior view more or less rectangular; surstyli evident as broadly formed lobes that are fused to the ventral margin of the epandrium; gonite in lateral view a large inverted U-shaped, well-sclerotized process, the anteroventral arm hook-like; aedeagus roughly rectangular, anterior margin concave with pointed angles ventrally; aedeagal apodeme poorly sclerotized, a Y-shaped process.

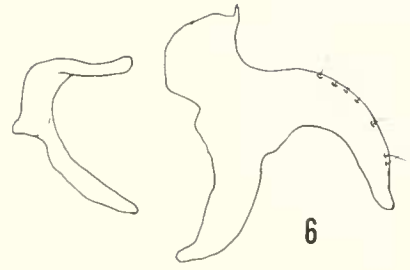
Type material.—The holotype male is labeled "NEPAL.Kaski Dist[riect] Chomrung, Sinuwa[,] 2250 m, 22 Oct 1985[,] Wayne N. Mathis." The allotype female and one male paratype (USNM) bear the same label data as the holotype. The holotype is double mounted (minute nadel in plastic elastomere block), is in good condition, and is deposited in the National Museum of Natural History (USNM), Smithsonian Institution.

Distribution.—This species is known only from the type series from Nepal.

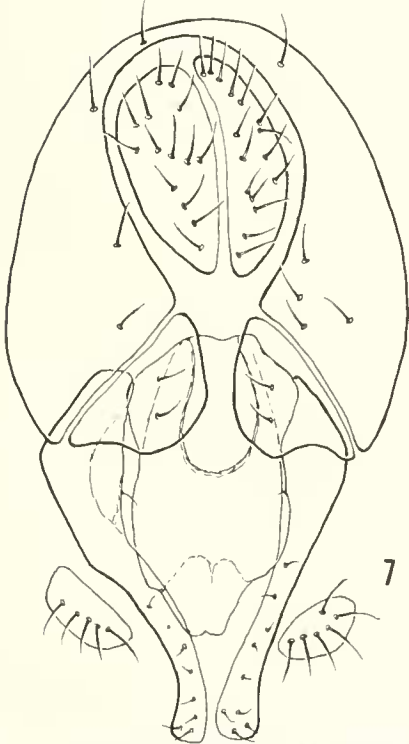
Etymology.—The specific epithet, *nepa-*



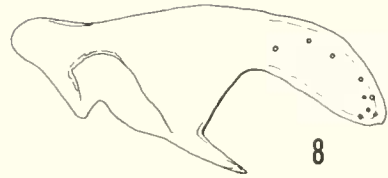
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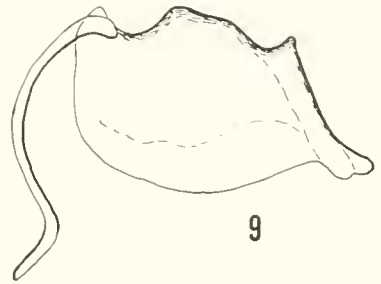
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Figs. 5-9. *Psilephydra iridescens*. 5. Male genitalia, posterior view. 6. Gonite and aedeagal apodeme, lateral view. *Psilephydra lyneborgi*. 7. Male genitalia, posterior view. 8. Gonite, lateral view. 9. Aedeagal apodeme and aedeagus, lateral view.

lensis, alludes to the country where this species was collected.

Remarks.—This species is similar to *P. fluvialis* and to a lesser extent to *P. kasikiensis* but may be distinguished from both and other congeners by its larger size, facial coloration, number of large dorsocentral setae, and structures of the male genitalia.

The *cyanoprosopa* Group

Diagnosis.—Genal seta lacking or reduced; anterior notopleural seta weakly developed, much smaller than posterior seta; fore femur bearing short, spine-like setae along posteroventral margin.

Species included.—*Psilephydra cyanoprosopa* Hendel, *P. lyneborgi* Zatwarnicki, and *P. iridescens* Zatwarnicki.

Psilephydra iridescens Zatwarnicki,

NEW SPECIES

Figs. 5–6

Description.—Medium-sized shore flies, length 3.0 mm.

Head: Frons subshining, dark brown; mesofrons undifferentiated; fronto-orbital setae 2, minute. First flagellomere pale, only darkened above; arista with minute hairs above, length slightly more than $3 \times$ length of 1st flagellomere. Facial protrusion occupying most of face, face dull black with generally metallic silvery microtomentum, gradually becoming metallic bronzy medially; eye-to-cheek ratio 0.46; genal setae poorly developed, but evident. Palpus black.

Thorax: Mesonotum moderately invested with microtomentum, subshining, dark brown; pleura from anepisternum ventrad more densely microtomentose than mesonotum, microtomentum silvery gray; anterior notopleural seta minute, posterior seta well developed, subequal to anepisternal seta, posterior seta inserted at same level as anterior seta; dorsocentral setae 2, posteriormost seta slightly displaced laterally, seta well developed, length of anterior seta about $\frac{1}{5}$ posterior seta. Scutellum flat, broadly rounded with small projection; basolateral scutellar seta minute, about $1.4 \times$ length of

apical seta. Halter yellowish. Wing uniformly darkened; costal vein ratio 0.21; M vein ratio 0.57. Legs dark colored, blackish; tarsi pale, darkened apically; trochanters and apices of tibiae brown; fore femur bearing posteroventral row of 4, short, spine-like setae.

Abdomen: Terga concolorous with mesonotum, invested laterally with whitish microtomentum; dorsal surface of terga 2–5 sparsely pitted. Male genitalia (Figs. 5–6) as follows: epandrium in posterior view as an inverted U, anteroventral margin truncate; surstyli evident as lobes with process in the middle of its anterior margin; gonite in posterior view with anterior process elongate, posteroventral process apically rounded, arched anteriorly, and directed ventrally; aedeagal apodeme in posterior view Y-shaped, in lateral view C-shaped, weakly broader centrally; aedeagus in posterior view roughly ovate, rounded posteroapically, anterior apex gradually tapered.

Type material.—The holotype male is labeled "THAILAND: S. Banna. Nakhon[,] 108 m.[,] V-5-10-[19]58/T. C. Maa Collector[,] Nr. 406." The holotype is glued to a small paper rectangle, is in good condition (apex of abdomen removed, dissected, and in an attached microvial), and is deposited in the Bernice P. Bishop Museum, Honolulu, Hawaii.

Distribution.—This species is only known from the holotype from Thailand.

Etymology.—The specific epithet, *iridescens*, alludes to the shimmering coloration of the face of this species.

Remarks.—This species is similar to *P. cyanoprosopa* but may be distinguished from it and other congeners by its pale 1st flagellomere, darkened wings, and structures of the male genitalia.

Psilephydra lyneborgi Zatwarnicki,

NEW SPECIES

Figs. 7–9

Description.—Medium-sized shore flies, length 3.0 to 3.30 mm.

Head: Frons dark brown; fronto-orbits

and mesofrons bare, shining; parafrons slightly duller, invested with sparse microtomentum. Fronto-orbital setae 3, minute, posterior 2 larger and subequal in size. Arista with minute hairs above, length slightly more than $3 \times$ 1st flagellomere. Facial protrusion occupying most of face; face dull black with metallic silvery blue microtomentum, becoming metallic bronzy dorsally; eye-to-cheek ratio 0.66, genal seta poorly developed, but evident. Palpus black.

Thorax: Mesonotum mostly dark, shining, covered with sparse, dark brown microtomentum; pleura with dense, silvery-grayish microtomentum; posterior notopleural seta well developed, its length more than twice length of anterior seta, posterior notopleural bristle inserted at about same level as anterior seta; dorsocentral setae 2, posteriormost seta slightly displaced laterally, well developed, length about twice that of anterior setae. Scutellum flat, broadly rounded with distinct projection; basolateral scutellar seta minute; apical scutellar seta well developed, subequal to posteriormost dorsocentral seta. Length of anepisternal seta about $1.5 \times$ length of posterior notopleural seta. Wing hyaline; costal vein ratio 0.17; M vein ratio 0.54. Halter yellowish white. Legs dark colored, blackish, only metatarsus yellowish; fore femur with posteroventral row of 7, short, spine-like setae.

Abdomen: Terga concolorous with mesonotum, invested laterally with whitish microtomentum, dorsal surface of terga 2–5 densely pitted. Male genitalia (Figs. 7–9) as follows: epandrium in posterior view as an inverted U, with arms wider toward anterior margins; surstyli fused to broad anteroventral margin of epandrium, hemispherical in shape, dorsal margin concave; gonite in posterior view weakly S-shaped, apex conspicuously wide and obtuse, anterior process in lateral view with broad and rounded apex, posteroventral margin with sharp process; aedeagal apodeme band-like, bent doubly in lateral view, Y-shaped in posterior view; aedeagus in posterior view longer than broad, basal half with folds lat-

erally, anterior margin tapered gradually with obtuse apex, ventral margin in lateral view rounded, dorsal margin roughly creased, anterior margin truncate, anteroventral apex forming nose-like process.

Type material.—The holotype male is labeled "S. India: Karnataka, Kemmangudi, 1200–1500 m[.] 11–16. xi 1977[.] Zool. Mus. Copenhagen Exp." The allotype female and one additional paratype female (ZMC) are labeled "India (Uttar Pradesh)[.] Dehra Dun Valley, c. 700 m[.] 4.–13. viii 1978[.] Copenhagen Zool. Mus. Exp." The holotype is double mounted (minute nadel in plastic elastomere block), is in good condition (abdomen removed, dissected, and in attached microvial), and is deposited in the Zoological Museum in Copenhagen.

Distribution.—This species is known only from the type series from India.

Etymology.—The specific epithet, *lyneborgi*, is a genitive patronym to honor Dr. L. Lyneborg, who has generously supported our work on shore flies.

Remarks.—This species is similar to *P. cyanoprosopa* but may be distinguished from it and other congeners by the relatively high gena, dark blue mesonotal color, scutellar protrusion, and structures of the male genitalia.

Genus *Dagus* Cresson

Dagus Cresson 1935: 345. Type species: *Ephydra rostrata* Cresson 1918, by original designation.—Wirth 1968: 24 (neotropical catalog).—Mathis 1982: 20–23 (review), 1983:717–726 (revision).

Phylogenetic considerations.—The discovery and study of two new species in *Dagus* and four new species in *Psilephydra* provided additional information concerning the phylogeny of these taxa. Mathis (1983) suggested previously that *Dagus* was the sister group of *Physemops*, primarily based on the elevated insertion of the posterior notopleural seta. That character state was then known only to species in these two genera. Two of the new species of *Psilephy-*

dra, *P. nepalensis* and *P. kaskiensis*, also have an elevated insertion of that seta, and, moreover, the face of *P. kaskiensis* is protrudent in a similar way to specimens of *Dagus*. Discovery of these character states casts considerable doubt on the sister-group relationship between *Dagus* and *Physemops* and indicates that such a relationship may exist between *Dagus* and *Psilephydra*, especially between the *fluvialis* group of the latter genus.

Although the sister group to *Dagus* is not clearly demonstrated, the monophyly of *Dagus* is not questioned in view of the evidence. Character evidence to establish this hypothesis was elaborated by Mathis (1983: 718), and we add to the characters he listed the unique condition of the epandrium, which does not extend around the dorsal margins of the cerci. Typically, the dorsal margin of the epandrium forms a connection around the cerci, forming an oval to circular opening in which the cerci and anal opening are situated. We must also note that the third character listed by Mathis, the ventral protrusion of the lower half of the face, is considerably weakened, as that character, which was used to substantiate the monophyly of *Dagus*, also occurs in *Psilephydra* (*P. kaskiensis*).

Among taxa clearly belonging to *Dagus*, the two new species described here are closely related, and together they form a monophyletic lineage, i.e. they are sister species. Character evidence to support this hypothesis is as follows (autapomorphic characters): fore tibia with a preapical, ventral tuft of long setae; and tarsomeres 4 and 5 of foreleg and tarsomere 5 of hind leg with large, ventral, scale-like setae.

Discussion.—The diagnosis of *Dagus* that Mathis (1983) presented remains accurate and is not repeated here. The addition of two new species, however, necessitates a revised key, presented below, to facilitate the identification of species

KEY TO SPECIES OF *DAGUS*

- 1. Arista long, 3–4× length of 1st flagellomere, conspicuously haired, length of longer hairs

- much greater than arisal width at base *D. trichocerus* Mathis
- Arista shorter, at most 2–3× length of 1st flagellomere, hairs barely evident, length less than arisal width at base 2
- 2. Posterior notopleural seta inserted at about same level as anterior seta; genal seta well developed, subequal in size to anterior fronto-orbital seta *D. dominicanus* Mathis, new species
- Posterior notopleural seta inserted conspicuously above level of anterior seta, usually 2–3× higher; genal seta weak, usually conspicuously smaller than anterior fronto-orbital seta 3
- 3. Gena short, about ½ eye height; specimens short, less than 2.25 mm *D. rostratus* (Williston)
- Gena high, ½ or more of eye height; specimens longer, usually greater than 2.25 mm 4
- 4. Fore tibia with preapical tuft of long setae ventrally; facial setae generally weak, those along oral margin especially so, usually less than length of anterior fronto-orbital seta *D. spanglerorum* Mathis, new species
- Fore tibia lacking preapical tuft of long setae ventrally; facial setae generally well developed, those along oral margin and usually 1–2 setae at lateral margin of facial prominence longer than anterior fronto-orbital seta *D. wirthi* Mathis

Dagus spanglerorum Mathis,

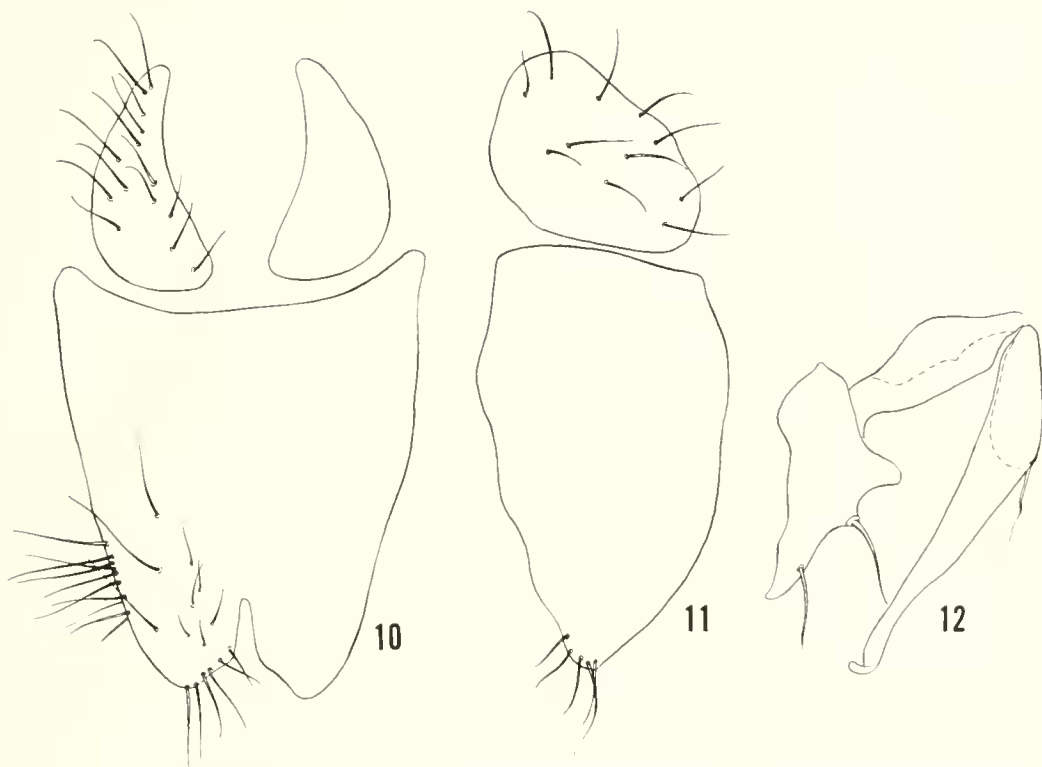
NEW SPECIES

Figs. 10–12

Description.—Medium-sized shore flies, length 3.2 to 4.0 mm.

Head: Frons entirely densely microtomentose, appearing velvety, blackish brown to black. Arista bearing minute hairs, barely evident, arisal length nearly 3 times length of 1st flagellomere. Facial protrusion in lateral view with anterodorsal surface less acutely angulate with oral margin; dorsal ½ of facial protrusion with bare, shining areas just below antennae dark, metallic blue, otherwise face micromentose, dark brown; facial setae generally weakly developed, especially setae along oral margin, these smaller than ocellar setae; eye-to-cheek ratio 0.47; eye width-to-face length ratio 0.66; genal seta weakly developed, smaller than anterior fronto-orbital seta.

Thorax: Thoracic chaetotaxy moderately well developed. Dorsocentral setae with 4 larger setae, all postsutural, and 2–3 smaller



Figs. 10–12. *Dagus spanglerorum*. 10, Male genitalia (cerci and epandrium), posterior view. 11, Male genitalia (cerci and epandrium), lateral view. 12, Internal male genitalia, lateral view.

presutural setae; postsutural intra-alar setae with 3–5 generally small setae; posterior notopleural seta inserted at distinctly more elevated position than anterior seta, nearly twice distance from ventral notopleural margin than anterior seta; hind coxal strap bare. Fore tibia with ventral, preapical tuft of well-developed setae; tarsomeres 4 and 5 of foreleg and tarsomere 5 of hind leg bearing large, scale-like setae along ventral surface. Costal vein index 0.13; M vein index 0.70.

Abdomen: Male genitalia (Figs. 10–12) as follows: epandrium, in posterior view, roughly triangular, ventral apex conspicuously cleft, projection on either side of cleft mucronate; lateral view of epandrium nearly bullet shaped with dorsal margin somewhat truncate and remainder tapered gradually to pointed ventral apex; gonite shorter than aedeagus, roughly triangular, longer

than wide, dorsal margin uneven, with a shallow projection about $\frac{1}{3}$ distance from base.

Type material.—The holotype male is labeled “DOMINICAN REPUBLIC[,] La Vega Province[:] Constanza (3.5 Km S)[,] 9 Nov 1984, sweeping P. & P. Spangler & R. Faitoute.” The allotype female and 104 paratypes (32♂, 73♀; USNM) bear the same label data as the holotype. Other paratypes are as follows: DOMINICAN REPUBLIC, La Vega Province: Constanza (8.5 km S), 9 Nov 1984, P. and P. Spangler, R. Faitoute (13♂, 38♀; USNM); Constanza (12 km S) 9 Nov 1984, P. and P. Spangler, R. Faitoute (1♀; USNM). The holotype is double mounted (minute nadel in plastic elastomere block), is in good condition, and is deposited in the National Museum of Natural History (USNM), Smithsonian Institution.

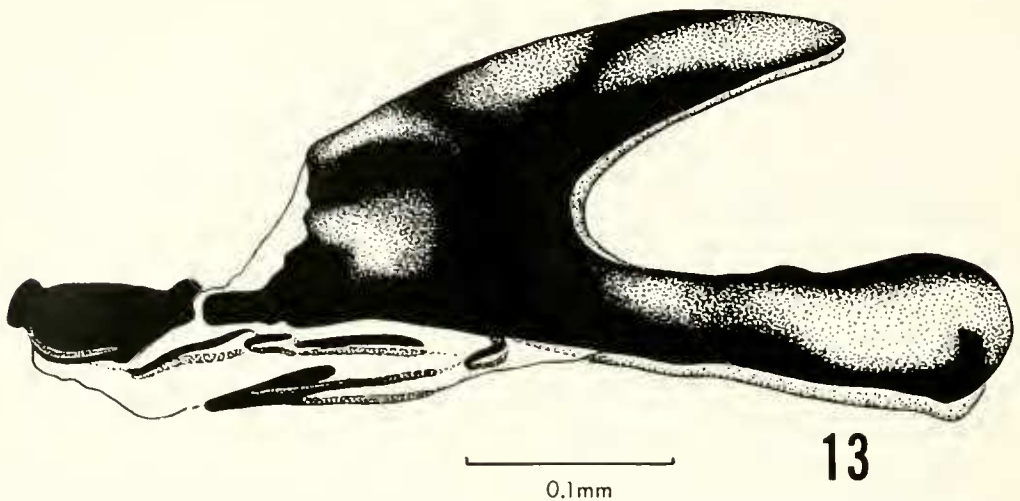


Fig. 13. *Dagus dominicanus*. 13, Cephalopharyngeal skeleton of third-instar larva, lateral view.

Distribution.—This species is known only from the Dominican Republic (Greater Antilles: Hispaniola).

Etymology.—The specific epithet, *span-glerorum*, is a genitive, plural patronym to recognize the collecting efforts of Paul and Phyllis Spangler, who, along with Robin Faitoute, collected the known specimens of this species as well as numerous other species of Ephydriidae.

Remarks.—This species is most easily distinguished from its congeners, especially *D. dominicanus*, by its larger size (smaller than *D. dominicanus* but larger than other congeners), the preapical, ventral tuft of long setae on the fore tibia (also present in *D. dominicanus*), the nearly bare arista, the reduced genal seta, the elevated insertion of the posterior notopleural seta, and the characters of the male genitalia.

Dagus dominicanus Mathis,

NEW SPECIES

Figs. 13–19

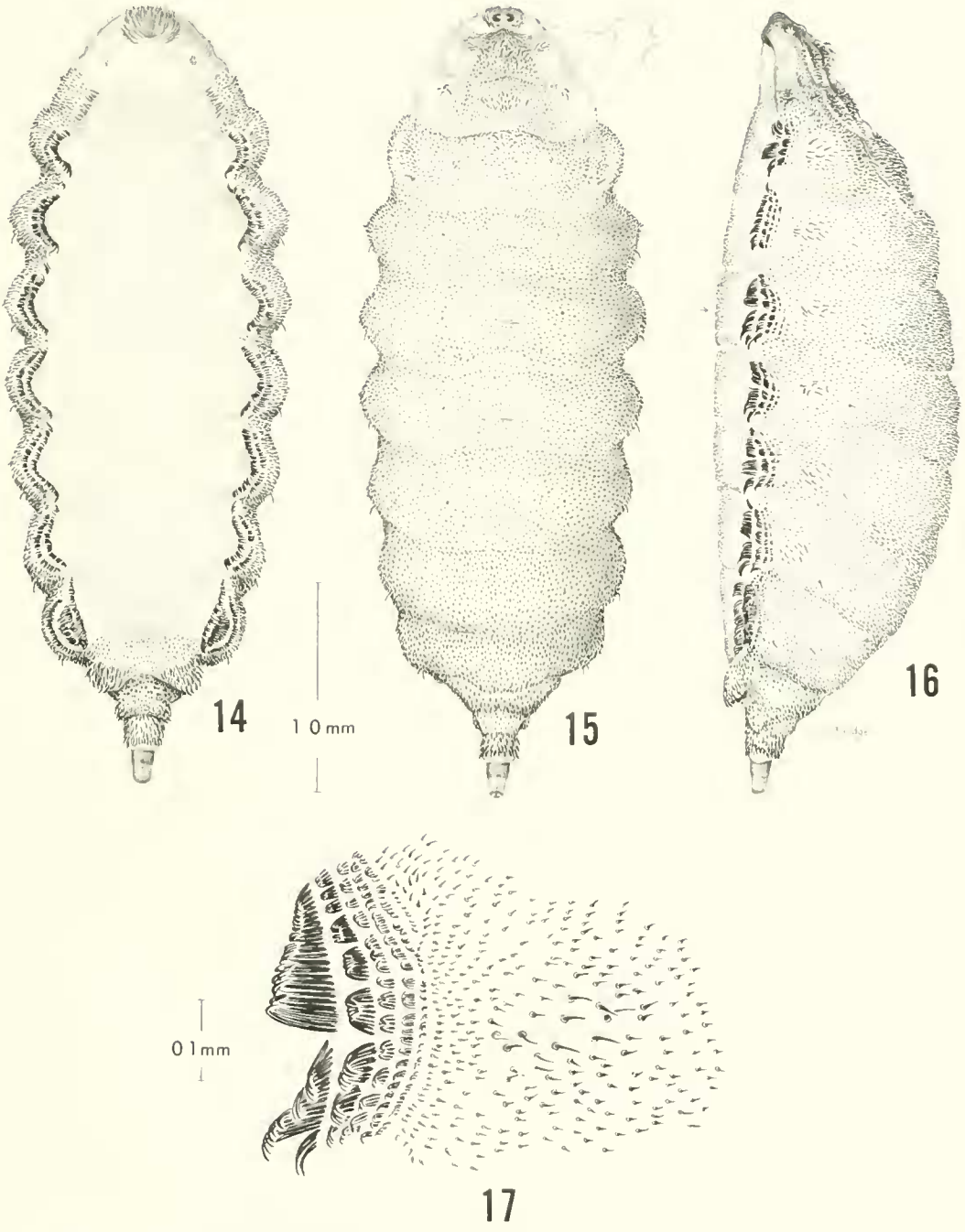
Description.—Medium-sized to large shore flies, length 3.8 to 5.25 mm.

Head: Frons entirely densely microtomentose, appearing velvety, blackish brown to black. Arista bearing minute hairs, barely evident, aristal length nearly 3 times length

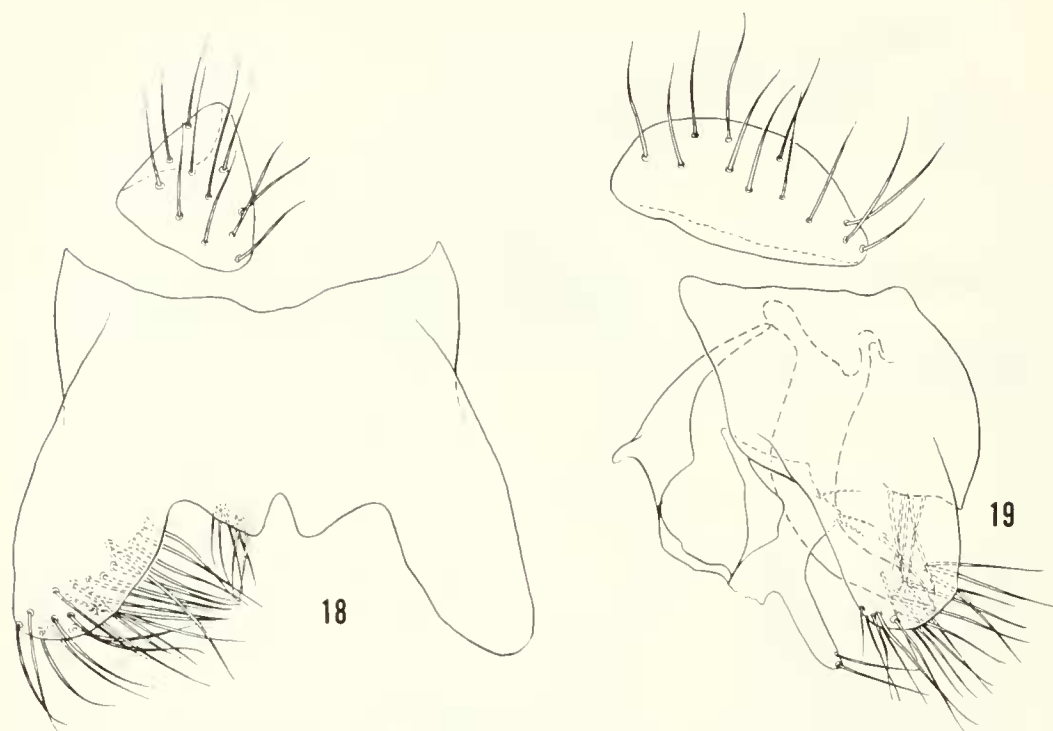
of 1st flagellomere. Facial protrusion in lateral view with anterodorsal surface less acutely angulate with oral margin; dorsal $\frac{1}{2}$ of facial protrusion with bare, shining area just below antennae dark, metallic blue to brown, becoming microtomentose ventrally, dark brown to gray along oral margin; facial setae generally well developed, especially setae along oral margin, these subequal to ocellar setae; eye-to-cheek ratio 0.55; eye width-to-face length ratio 0.64; genal seta well developed, subequal to anterior fronto-orbital seta.

Thorax: Thoracic chaetotaxy well developed. Dorsocentral setae with 5 larger setae, anterior pair presutural to sutural, and 2–3 smaller presutural setae; postsutural intra-alar setae with 3–5 moderately well-developed setae, all smaller than largest dorsocentral setae; posterior notopleural seta inserted only slightly above level of anterior seta; hind coxal strap bare. Fore tibia with ventral, preapical tuft of well-developed setae; tarsomeres 4 and 5 of foreleg and tarsomere 5 of hind leg bearing large, scale-like setae along ventral surface. Costal vein index 0.09; M vein index 0.88.

Abdomen: Male genitalia (Figs. 18–19) as follows: epandrium, in posterior view, roughly rectangular but with very wide me-



Figs. 14-17. *Dagus dominicanus*, puparium. 14, Ventral view. 15, Dorsal View. 16, Lateral view. 17, Enlargement of 3rd welt (see arrow on Fig. 16).



Figs. 18–19. *Dagus dominicanus*. 18, Male genitalia (cerci and epandrium), posterior view. 19, Male genitalia (cerci, epandrium, and internal genitalia), lateral view.

dian cleft ventrally, producing 2 large, lateral, broadly rounded projections and 2 much smaller, medial, pointed projections within larger cleft, medial margins of larger processes and lateral margin of inner projections densely setulose; lateral view of epandrium somewhat bullet shaped but with ventral margin broadly rounded; gonite about as long as aedeagus, basal portion roughly rectangular and with a long, narrow, digitiform process extended apically; aedeagus gently curved and tapered to rounded tip.

Cephalopharyngeal skeleton of third-instar larva (Fig. 13): Mandible lacking; hypopharynx in lateral view roughly rectangular but with knob-like process anterodorsally and posteroventral angle truncate; ocular depression poorly developed; dorsal cornu evenly tapered to apical point; ventral cornu spatulate.

Puparium (Figs. 14–17): Dimensions:

length 4.45–4.70 mm, width 1.65–1.75 mm; height 1.5 mm. Shape: generally oval in ventral or dorsal views (Figs. 14, 15) with 7 ventrolateral, rounded welts forming a crenulate lateral margin, each welt fringed with short setulae (welts probably used for locomotion): retreated margins between welts extended dorsally as shallow furrows that become weaker dorsally; in lateral view dome-shaped (Fig. 16); dorsum gently and evenly rounded, venter nearly flat; anterior spiracle with 4 small papilla-like projections; respiratory tubes essentially fused together externally.

Type material. — The holotype male is labeled “DOMINICAN REPUBLIC[,] La Vega Province[,] Constanza (12Km S) 9 November 1984[,] P. Spangler & R. Fautoute.” The allotype female bears the same label data as the holotype. Other paratypes are as follows: DOMINICAN REPUBLIC: La Vega Province: Constanza (10 km S), 10

Nov 1984, P. Spangler, R. Faitoute (4♂, 1♀; USNM); Jarabacoa, 13 Nov 1984, P. and P. Spangler, R. Faitoute (1♀; USNM). The holotype is double mounted (minute nadel in plastic elastomere block), is in good condition, and is deposited in the National Museum of Natural History (USNM), Smithsonian Institution.

Distribution.—All known specimens of this species are from the Dominican Republic (Greater Antilles: Hispaniola).

Etymology.—The specific epithet, *dominicanus*, alludes to the Dominican Republic, the country from which the species was collected.

Remarks.—This species is most easily distinguished from its congeners, especially *D. spanglerorum*, by its larger size (it is the largest species thus far known in the genus), the preapical, ventral tuft of long setae on the fore tibia (also present in *D. spanglerorum*), the nearly bare arista, the well-developed genal seta, the insertion of the posterior notopleural seta at nearly the same level as the anterior seta, and the characters of the male genitalia.

The third-instar larvae and puparia were collected 10 km south of Constanza (9 November 1984) by P. Spangler and R. Faitoute. The habitat was a steep hillside with a seepage area in a shallow, V-shaped depression just above the road cut. Some of the area had a covering of algae.

**Catalog of Genera and Species of Dagini
Tribe DAGINI Mathis 1982
Genus DAGUS Cresson**

DAGUS Cresson 1935: 345. Type species: *Ephydra rostrata* Cresson 1918, orig. des.—Wirth 1968: 24 [neotropical catalog].—Mathis 1982: 20–23 [review], Mathis 1983: 717–726 [revision].

dominicanus Mathis 1988: 116.

Type locality: DOMINICAN REPUBLIC. La Vega: Constanza (12 km S).

Distribution: Dominican Republic.

rostratus Cresson 1918: 66 (*Ephydra*), 1935:

346 [combination, designated as type species of *Dagus*].—Wirth 1968: 28 [neotropical catalog].—Mathis 1982: 21–23 [review, lectotype designation]; 1983: 720–722 [revision].

pygmaea Williston 1896: 402 (*Ephydra*) [preoccupied, Haliday 1833].

Type locality: WEST INDIES: Saint Vincent: Perseverance Valley.

Distribution: West Indies (Cuba, Dominica, Jamaica, Saint Vincent) and Mexico south through Guatemala and Costa Rica to Venezuela and Brazil.

spanglerorum Mathis 1988: 114.

Type locality: DOMINICAN REPUBLIC. La Vega: Constanza (3.5 km S).

Distribution: Dominican Republic.

trichocerus Mathis 1983: 724–725.

Type locality: CUBA. Pinar del Rio: So-roa.

Distribution: Cuba, Dominican Republic.
wirthi Mathis 1983: 722–724.

Type locality: JAMAICA, Port Parish.

Distribution: Jamaica.

Genus *DIEDROPS* Mathis and Wirth

DIEDROPS Mathis and Wirth 1976: 126.

Type species: *Diedrops aenigma* Mathis and Wirth 1976, orig. des.—Mathis 1982: 6–9 [review].—Mathis 1984: 349–353 [key, notes].

aenigma Mathis and Wirth 1976: 129.—Mathis 1982: 7–8 [review].

Type locality: MEXICO. Michoacan: Puerto Morillos.

Distribution: Mexico (Michoacan, Sinaloa).

hitchcocki Mathis and Wirth 1976: 129.—Mathis 1982: 8–10 [review].

Type locality: PERU. Moquegua: Yacango.

Distribution: Peru.

roldanorum Mathis and Hogue 1986: 23–26.

Type locality: COLOMBIA. Tolima: Boqueron (3 km W).

Distribution: Colombia.

steineri Mathis 1984: 351–352.

Type locality: PANAMA. Chiriqui: Bambito (Rio Chiriqui Viejo, 1770 m).

Distribution: Central America (Costa Rica to Panama).

Genus *PHYSEMOPS* Cresson

PHYSEMOPS Cresson 1934: 211. Type species: *Psilephydra nemorosa* Cresson 1914, orig. des.—Wirth 1968: 20 [neotropical catalog], 1970: 170–177 [review].—Mathis 1977: 555–556 [generic key and discussion], 1982: 10–20 [review].

The *nemorosus* Group

azul Wirth 1970: 172–173.—Mathis 1982: 14 [review].

Type locality: MEXICO. Oaxaca: Valle Nacional.

Distribution: Mexico (Oaxaca).

nemorosus Cresson 1914: 244 (*Psilephydra*).—1918: 64 [review, figure of head]; 1934: 211 [combination, designated as type species of *Physemops*].—Wirth 1968: 20 [neotropical catalog], 1970: 174–175 [review].—Mathis 1982: 14–15 [review].

Type locality: COSTA RICA. Juan Vinas.

Distribution: Circumcaribbean and South America. Mexico (Oaxaca) and the West Indies (Dominica) south through Central America (El Salvador, Honduras, Nicaragua, Costa Rica, Panama) to Ecuador (Chimborazo) and Brazil (São Paulo).

wheeleri Wirth 1970: 176.—Mathis 1982: 16–18 [review].

Type locality: PANAMA. Canal Zone: Las Cruces Trail.

Distribution: Panama south to Ecuador (Santo Domingo de los Colorados).

The *panops* Group

fairchildi Wirth 1970: 173.—Mathis 1982: 18 [review].

Type locality: PANAMA. Panama: Cerro Capana.

Distribution: Panama south to Colombia (Vicinity of Bogota and Medellin).

maldonadoi Wirth 1970: 173–174.—Mathis 1982: 19–20 [review].

Type locality: PUERTO RICO. Yauco-Lares Road (km 29).

Distribution: Puerto Rico.

panops Wirth 1970: 175–176.—Mathis 1982: 20 [review].

Type locality: HAITI.

Distribution: Haiti.

Genus *PSILEPHYDRA* Hendel

Psilephydra Hendel 1914: 99. Type species: *Psilephydra cyanoprosopa* Hendel 1914, orig. des.—Cresson 1918: 63 [diagnosis, subfamilial placement].—Mathis and Wirth 1976: 128 [comparison with *Diadrops*].—Cogan and Wirth 1977: 338 [Oriental catalog].—Mathis 1982: 24–28 [review].

The *cyanoprosopa* Group

cyanoprosopa Hendel 1914: 100.—Cresson 1934: 211 [list].—Cogan and Wirth 1977: 334 [Oriental catalog].—Mathis 1982: 25–27 [review].

Type locality: TAIWAN. Hoozan.

Distribution: Taiwan.

lyneborgi Zatwarnicki 1988: 112.

Type locality: INDIA. Karnataka: Kemangudi (1200–1500 m).

Distribution: India.

iridescens Zatwarnicki 1988: 112.

Type locality: THAILAND. S. Banna Nakhon (108 m).

Distribution: Thailand.

The *fluvialis* Group

fluvialis Miyagi 1977: 88 (*Lamproscatella*).—Mathis 1982: 27–28 [review].

Type locality: JAPAN. Shikoku Island: Nametoko. Ehime-ken.

Distribution: Japan (Honshu, Shikoku) and the Ryukyu Islands (Okinawa-honto).

kaskiensis Mathis 1988: 108.

Type locality: NEPAL. Kaski: Chomrung (Sinuwa, 2250 m).

Distribution: Nepal.

nepalensis Mathis 1988: 110.

Type locality: NEPAL. Kaski: Chomrung (Sinuwa, 2250 m).

Distribution: Nepal.

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